Big Data, Bigger Stories?
The Journey from Data to Impact in Public Libraries

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ABSTRACT

Data storytelling serves as a powerful tool for public libraries to move from measurement to demonstrating impact. Drawing on focus groups and interviews with eleven library staff members from six large urban public library systems, this article identifies eight main challenges that public libraries face in the process of implementing data management practices, public narrative strategies, and data storytelling practices. The article finds that libraries have made progress in data management and public narrative, particularly for short-term goals such as data-driven decision making and community impact narrative in promoting special programs or securing funding. But they are still missing main narratives that define the library's mission and long-term value which can guide internal operations and strengthen connections with the external communities they serve. Public libraries are still facing a long journey from big data to bigger and more impactful stories. The cases of these libraries offer broader insights for the field of information science on how to transform data into narratives that serve the public good.

KEYWORDS

Data Storytelling, Public Library, Data Management, Public Narrative, Community Impact

INTRODUCTION

As public institutions, communicating the social values and impact of public libraries is an important aspect of effective library management. And the shifts toward open data provide new opportunities for this goal (Calvert & Goulding, 2015; Stephen & Kyrillidou, 2013). By using data such as network usage, circulation statistics, program attendance, and user demographics, libraries can make data-driven decisions to tailor their services to stakeholders, improve operational efficiency, and advocate for funding (Stubbing, 2022).

Despite these advantages, libraries are still struggling with transforming the data they collect into community impact. In the context of six public libraries, preliminary findings from interviews and focus groups reveal that one of the biggest challenges faced by libraries is managing data effectively across multiple platforms and using it to create a public impact. It underscores the broader challenge in the field: while many libraries collect **big** data, they struggle to synthesize it into **bigger** stories that advocate for their role in the community.

This paper aims to contribute to this emerging area of research by examining the specific strategies libraries can employ to create both broad and targeted story narratives. The case studies from public libraries highlight the dual need for main stories that define the library's mission that serve **long-term** goals and specific narratives that serve **short-term** goals, such as promoting special projects or securing funding. In doing so, we hope to offer practical insights for libraries navigating the complexities of data management, public narrative and data storytelling in open environments.

In the field of information science, data storytelling is increasingly seen as an important tool to make complex information meaningful and actionable, not only within organizations, but also in communicating with the public (Lo & McDowell, 2024). As institutions across different sectors are struggling with how to use big data effectively and ethically, the practices of public libraries in data management and narratives can offer valuable insights. Public libraries are public-facing, not-for-profit institutions of governmental origin, so they offer a distinct context for data storytelling. Unlike private companies, where a profit motive often drives data into streamlined narratives quickly, public institutions like libraries operate with different goals, emphasizing transparency, equity, and community service. By studying how these public libraries translate big data into public narratives, we contribute to broader conversations in information science about how data practices support public values such as equity, transparency, and social wellbeing.

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RELATED LITERATURE

Data Management

Public libraries are increasingly using data analytics to manage collections, demonstrate library values and impact, and enhance library service (Magnuson, 2016; Showers, 2015). However, as libraries enter open data environments where their data is shared publicly, new challenges arise. Researchers have raised concerns about the potential for decontextualized or misinterpreted data to be used to advance misleading narratives. Open data, while a tool for transparency, can also be weaponized in political debates, such as those surrounding book banning or intellectual freedom (Lankes, 2011). As Lankes (2016) notes, the ability to shape narratives from data is crucial in an open data environment, where misinterpretations can easily arise.

Public Narrative

How to deliver the social, economic values and impact is a key in the public library management (Stephen & Kyrillidou, 2013). The use of narratives is an important way to help public libraries move from measurement to impact (Van Wessel, 2018). In fact, libraries are making efforts to tell library values and deliver impact through different approaches. For example, narratives can also be used to understand the values of digital collections with specific anecdotes and broad changes to library evolution. Narratives can also be used to articulating the uniqueness of library identity. By collecting the personal stories from staff and users, they tried to identify library as learning communities which have the potential to change the life of everyone, from the unemployed worker who can improve career skills to the mother who enjoy the reading time with kids (Eicher-Catt & Edmondson, 2016).

Data Storytelling

The advancement of big data, analytical tools, and technology has made storytelling increasingly appealing for libraries. However, library managers doubt the validity and analysis of data in supporting narratives (Calvert & Goulding, 2015). A key issue in addressing these concerns lies in how libraries communicate their value through data. Instead of collecting simple data to show "who/what/when" of library services, collecting data that can be used to show "how" libraries impact their communities is the trend (McDowell, 2024). Data storytelling, the practice of using data to support compelling narratives, has been identified as an essential skill in other sectors, such as public health and education, but its application in libraries still have a lot of obstacles (McDowell, 2024). These obstacles include fear of data, lack of tools, time and training, disconnections with the audience (McDowell, 2024). While much of the existing literature focuses on data analytics as a tool for improving library operations (Eaton, 2017), there is less emphasis on the role of data storytelling in a broader way. Libraries need to develop the skills to translate their raw data into meaningful stories that resonate with the public and stakeholders. These narratives should balance between demonstrating the library's short-term impact, such as through successful programs or budget requests, and reinforcing its broader, long-term contributions to community well-being.

RESEARCH METHODS

The data were collected through two primary methods: (1) focus groups and (2) semi-structured interviews. These methods were used to examine the data management and storytelling practices within six public libraries and to explore the challenges they face and how they address them. We conducted the focus groups within Austin Public Library to clarify the main challenge in data storytelling. To further explore how public libraries navigate data practices and storytelling in their services, we conducted eleven interviews from six public libraries, including Austin Public Library, San Antonio Public Library, Harris County Public Library, Las Vegas-Clark County Library District, Brooklyn Public Library, and Charleston County Public Library. The peer libraries were selected based on recommendations from library staff interviewed, using a snowball sampling approach. Table 1 is the staff we interviewed in six different public libraries and their positions. For reasons of confidentiality, we do not disclose the specific roles of our library staff. Instead, they are categorized as either communication-oriented or data-oriented staff.

City of Public Library	Number of Library Staff	Roles
Austin Public Library	3	Communication-oriented staff (1) Data-oriented staff (2)
San Antonio Public Library	2	Communication-oriented staff (1) Data-oriented staff (1)
Harris County Public Library	1	Communication-oriented staff (1)
Las Vegas-Clark County Library District	3	Communication-oriented staff (1) Data-oriented staff (2)

| Brooklyn Public Library	1	Communication-oriented staff (1)
Charleston County Public Library	1	Communication-oriented staff (1)

Table 1. Library staff from six public libraries

Focus Group Discussion

During the focus group, library staff discussed the primary challenges in data storytelling faced by Austin Public Library. A major issue identified was the difficulty in managing data across multiple systems and effectively using it to create a public impact. Current efforts in data librarianship mainly focus on reporting data to various stakeholders. However, there is a notable gap in translating this raw data into meaningful stories that can drive informed decision-making. From the focus group discussions, we identified the need to address these challenges by improving data curation practices and enhancing the role of the public information office in leveraging data for library services.

Interviews

For interviews, both data-oriented staff and communication-oriented staff were invited while focusing on three key themes shown in Figure 1. The discussions were guided by open-ended questions, allowing conversations to naturally explore their existing practices and knowledge related to data storytelling in libraries. We ensured that each staff covered one of the first two themes based on their areas of expertise, either data management practices or public narrative strategies. Additionally, all staff were asked to address Theme 3, allowing them to provide diverse perspectives on the same topic in data storytelling. This approach facilitated a comprehensive understanding of data use and storytelling within the library's operations.

In the first theme, we explored the key sources of data, the technologies used to collect and manage that data, and the specific individuals or departments responsible for data. The second theme focused on the main narratives in libraries and the extent to which data is used to shape and support those stories. In the third theme, we examined concrete examples of data storytelling, including specific cases, documents, and reflections on lessons learned and areas for improvement.
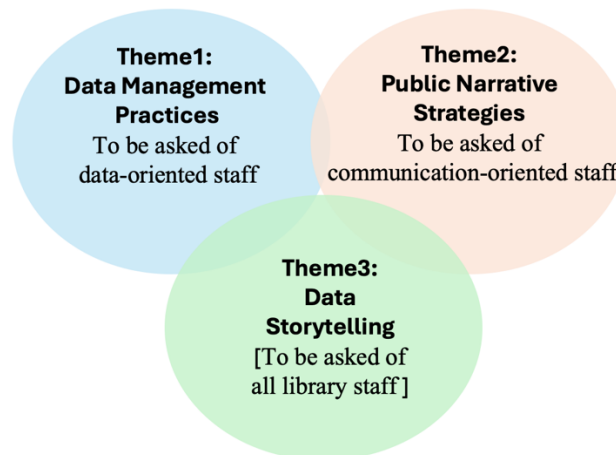
Figure 1. Three themes in the interviews

CHALLENGES IN DATA STORYTELIING

The following findings are based on data collected from both focus groups and interviews. This approach enabled a thorough exploration of the public libraries' data management and storytelling practices, uncovering several key challenges impact its operational effectiveness and community engagement. Here listed eight primary obstacles identified via interviews in data, storytelling, and data storytelling aspects (Fig 2).

Themes	Challenges	Strategies
Data Management Practices	• Insufficient User and Usage Data • Inconsistent Measurement and Evaluation • Lack of a Centralized Data System	• External Partnership and Feedback • Diverse Evaluation Metrics of Success • Integrated Data System
Public Narrative Strategies	• Ineffective Decision-Making Process • Gap in Community Impact Narrative • Lack of a Central Narrative	• Data-Driven Decision-Making • Community Impact Narrative • Rebranding and Narrative Building
Data Storytelling	• Misalignment with Mission and Vision • Lack of Coordination Between Data Practices and Public Narratives	• Alignment with Mission and Vision • Fusion Between Data Practices and Public Narratives

Figure 2. Themes, challenges, and strategies in the journey from data to impact

Data Management Practices

Insufficient User and Usage Data -> Inconsistent Measurement and Evaluation -> Lack of a Centralized Data System

The study revealed significant deficiencies in collecting comprehensive user information and their data on resource usage. While some data is gathered through staff surveys in library activities, the libraries lack crucial information, such as how patrons discover programs or what factors influence their participation. This gap hinders the libraries' ability to tailor its services to meet user needs effectively. This absence of comprehensive user data also impacts day-to-day operations. Efforts to streamline services, such as library card sign-ups and access to digital collections, are hindered by the lack of detailed usage metrics. The data-oriented staff complained "I'm working to make the most popular resources more accessible, but I still don't have enough information to know what's being used". Without a clearer understanding of which resources are most in demand or how digital content is accessed, libraries struggle to optimize their offerings and improve user satisfaction.

These challenges in data practice are exacerbated by an inconsistency of measurement and evaluation. From the interviews, while basic metrics like attendance are tracked in programs, the overall efforts in data collection varies across staff and programs, resulting in gaps that limit the libraries' ability to evaluate performance comprehensively. There is a notable absence of structured policies and procedures to systematically track, analyze, and evaluate programs and their outcomes. As one staff mentioned, their evaluation process "… isn't scientific, but it's based on prior experience and what we know has worked in the past". This lack of a cohesive evaluation culture hinders the libraries' ability to measure success or identify areas for improvement accurately.

The fragmentation of data systems further complicates the situation. Library data-oriented staff frequently struggle to identify the specific types of data needed for operational improvements. This issue results in inconsistent data requests and often incorrect information being logged. One staff mentioned "The siloed nature of the data and the lack of a centralized system" are preventing library telling a story." Another staff echoed this concern, explaining, "Separate systems manage digital library services... Unfortunately, they are siloed, so it's tough to connect different resources."

Public Information Strategies

Ineffective Decision-Making Process -> Gap in Community Impact Narrative -> Lack of a Central Narrative

Effective public information strategies rely on turning internal data into meaningful stories that inform decision-making and demonstrate impact. However, findings from the case studies reveal critical gaps in how libraries currently use data to shape both internal decisions and external narratives.

One aspect is the library communication-oriented staff exhibit a static approach rather than data-driven decision-making to program planning and community engagement. Efforts are concentrated on fixed and specific demographics, like parents during the summer reading program, without adapting strategies to meet evolving community needs. As one staff raised this problem, "We haven't really evolved our approach. We keep doing the same things, expecting different results." This stagnation has led to limited success in reaching new audiences or expanding engagement. Program collaboration requests are reviewed every three weeks, often based on prior experiences and subjective methods rather than comprehensive, data-driven analysis. Although a policy exists to guide these decisions, it is not informed by in-depth data analysis, resulting in inefficiencies and missed opportunities for effective partnerships and program improvements.

Beyond internal decision-making, the libraries also struggle to translate quantitative data to broader community impact. Although libraries collect quantitative data, such as program attendance numbers, it does not effectively translate this information into compelling stories that showcase the libraries' impact on the community. As one library staff mentioned, "We're often missing a narrative that shows how we're impacting the community. We gather numbers, but we don't always turn those numbers into meaningful stories". This oversight has led to a waste of big data, weakening the libraries' ability to demonstrate its social values. Instead, the libraries rely heavily on anecdotal stories to represent its work. These tend to emphasize isolated, feel-good moments rather than highlighting the institution's sustained contributions across programs and services. Despite having access to useful metrics, such as computer usage or digital access rates, data-oriented staff are not equipped with the skills or power to weave these data points into holistic, persuasive narratives. However, the future direction should be "We need to move from telling feel-good stories to telling impactful stories that show the library's broader value", like one library staff stressed.

These issues from public information strategies ultimately attribute to the absence of a cohesive, central narrative that defines the library's role. These case studies revealed that public libraries lack a clear, unified narrative that communicates its role in the community beyond being a repository of books. One library staff claimed that "Libraries, in general, are struggling with defining who they are beyond books. We're not telling a story that captures everything we do besides books." This gap is not unique to one or a certain public library; many libraries face challenges in redefining their roles in the digital age.

Data Storytelling

Misalignment between Mission/Vision and Daily Operation->Lack of Coordination Between Data Practices and Public Narratives

There is a disconnect between libraries' mission and vision and their daily operations in both data management practices and public information strategies. Although libraries' mission is to inspire all to discover, learn, and create, and its vision emphasizes equity, inclusion, access, and diversity, library staff do not consistently apply these principles in their daily activities. For example, this misalignment impacts in how data is implemented within libraries. Data staff lack the motivation or consistent efforts to organize and interpret data in ways that align with the libraries' broader mission and vision. One staff tried to explain this, "I think we're missing the storytelling component. We have a lot of anecdotal stories but don't always back them up with data. For example, we know that a branch may have high computer usage, but we don't always use that data to paint a fuller picture of the library's role in the community".

This disconnect is worse in how data is requested and used by leadership and communication-oriented staff. Although libraries collect a wide range of data, requests typically center on surface-level metrics rather than deeper analysis that could inform strategic decisions. One staff noted that "Sometimes people don't know what to ask for, or they ask the wrong questions... Managers sometimes ask for simple data dumps, but we could do more, like analyzing trends in incidents to help with security measures." For instance, incident data related to rule violations is tracked in a MySQL database. However, the data analysis tools available produce only basic reports, lacking the sophistication needed for actionable insights. This points to a broader gap between data science and storytelling within public libraries: data is collected, but it is not meaningfully synthesized or communicated in ways that reflect the libraries' mission or support long-term strategic vision.

This data storytelling is also challenged with cross-department collaboration. An interesting case is when communication-focused staff struggle to understand users' interests or even the scheduling of programs. However, staff involved in data practices are aware that this information can be extracted from usage patterns and visitation

data. As one data-oriented staff explained, "I can tell you that from the data, just by observing resource usage and user visits." However, a lack of coordination and communication between those managing data and those communicating public narratives results in missed opportunities to connect insights. This disconnect underscores the need for stronger collaboration between data-oriented team and communication-oriented team to ensure that data is not only collected but meaningfully translated into engagement strategies.

STRATEGIES IN DATA STORYTELIING

We identified key strategies from six public libraries use to match the challenges we found. However, it's important to acknowledge that while these strategies are valuable, they have limitations and do not fully resolve all the challenges (Fig 2).

Data Management Practices

External Partnership and Feedback -> Diverse Evaluation Metrics of Success -> Integrated Data System

Several libraries have effectively leveraged external partnerships to enhance user engagement and improve data collection. The Las Vegas Public library and San Antonio public library have leveraged external partnerships Orange Boy to boost user engagement and data collection. Through its collaboration with Orange Boy, a data platform tailored for libraries and integrated with U.S. Census data, the library can target specific demographics, such as low-income families. A recent direct mail campaign using Orange Boy resulted in 9,000 new library card registrations in Las Vegas Public library. The library staff mentioned it is "a game changer for us in tracking what drives engagement and success." Similarly, during the 2020 election, Charleston County Public Library as a voting site contributed to a significant increase in library card sign-ups.

Las Vegas Public Library further strengthens its data collection efforts through direct patron feedback. Tools such as comment cards and surveys are regularly used, and the library hosts an annual customer appreciation day to gather input on program preferences and service improvements. For example, "we found that most people prefer programs on weekdays and in the afternoons, which was a bit surprising to us. We also asked about program preferences and new items people wanted to see, and we found an even split between interests like crafts, cooking, concerts, STEM activities, and board games". All feedback can be used for future improvements.

Defining and measuring success is another way where libraries have developed data management practices. Success is primarily measured by program attendance and circulation of library collections. For new services, such as adult education, clear metrics have been established, tracking appointments and group session participation. "Success varies depending on the demographics", according to one staff from Brooklyn Public Library. Program success varies by audience group, for example, "for teen programs, we don't expect large numbers, but we do notice a loyal following that attends regularly. For seniors, we gauge success based on whether they retain knowledge from technology classes. It's not always about numbers but whether the programs positively impact the participants.". But career and business development programs still face challenges in tracking long-term success, such as whether participants ultimately secure employment. "We offer career development, help with resumes, interview skills, and even business plans. It's easy to measure how many people use these services, but tracking if they got the job is harder since it relies on them reporting back to us," Metrics on diversity, equity, inclusion, and accessibility (DEIA) initiatives is also a way to measure progress and commitment.

However, not all impact is easily quantifiable. Success is not always easily measurable. One marketing staff in Las Vegas Public Library noted that even a social media post that receives few likes or comments can still hold value. The absence of engagement does not diminish its worth; rather, it contributes to online awareness. If the post hadn't been shared at all, there would be even less awareness among the audience. "Is that an invisible post? Does that mean that the post was not worth posting because it didn't get a whole bunch of comments and a whole bunch of shares, and you know people talking about it? The answer is, no, the answer is no, because again, it drives the online awareness for the thing. And if we didn't post about it at all, you'd have even less awareness for the post". The content and consistency of posts are more important than measurable success.

Effort to build centralized data systems is also one priority in improving strategies. At the Brooklyn Public Library, library staff emphasized ongoing work to connect disparate data sources into a cohesive system. These efforts are especially important in adapting to shifting usage trends, for example, increased digital engagement and decreased physical checkouts during the pandemic. The goal is to better understand and balance usage of both digital and physical resources. Austin Public Library is actively working to centralize its data systems. "We're using a MySQL database to centralize data," one staff member shared, "but we plan to move it to the city's Oracle data warehouse.

This will allow us to store larger amounts of data, capture data at more granular levels (like hourly instead of daily), and perform more advanced trend analyses." Such technological upgrades represent a critical step toward building a more integrated and centralized library system.

Several other staff echoed the need for a centralized data system. However, they noted that current data-sharing practices are largely limited to aggregated data, which is typically shared internally, with city officials, or with the media. The primary data collected by public libraries include circulation statistics, visitor numbers, technology usage, and program participation, with different departments responsible for specific data sets.

Still, challenges remain in fully integrating data systems. A designated person or department is usually tasked with compiling and reporting aggregated data monthly. Despite these efforts, integrating and sharing data at a granular level across departments remains a challenge.

Public Information Strategies

Data-Driven Decision Making -> Community Impact Narrative -> Rebranding and Narrative Building

Public libraries are increasingly using data not only to inform internal decisions but also to craft compelling public narratives and shape their identity. Across several case studies in peer libraries, we observed how libraries are strategically leveraging data to advocate for funding, refine outreach strategies, guide service improvement, and communicate their impact more effectively.

For example, Brooklyn Public Library effectively used data to advocate against city-proposed budget cuts by demonstrating the potential negative impact on services, such as reduced library hours and program availability. "We used data to advocate against budget cuts proposed by the city. We demonstrated the impact of the cuts on services, like reducing library hours and programs. This helped mobilize public support, resulting in 30,000 letters sent to the mayor, and ultimately, the cuts were avoided". This case demonstrates how data can serve as a powerful advocacy tool when aligned with a clear narrative about public value.

Similarly, Harris County Public Library leverages data to guide policy and development decisions, including grant applications. By using GIS data to map its branches, the library identified "library deserts", areas lacking access to services, and successfully advocated for funding to establish access points like book vending machines and Wi-Fi hotspots in underserved communities. In doing so, the library used data not just for analysis but to directly shape equitable service delivery.

In addition to funding advocacy, libraries are using data to refine their outreach strategies. Las Vegas Public Library takes a highly analytics-driven approach to its social media strategy. After noticing stagnant engagement with static images, the library conducted an A/B test comparing video content to static posts. "We ran an A/B test comparing video content to static posts and found that the video content resulted in two to three times more engagement". Consequently, the library shifted its strategy to focus on vertical video content, effectively capturing more attention online.

San Antonio Public Library has also embraced targeted outreach through data. Using customer analytics tools like Savannah, they effectively target patrons based on their interests. For instance, they have established a group called "Bedtime Stories," which comprises individuals who frequently check out children's literature. This group is used to tailor messaging about summer reading programs specifically for them. Additionally, the library utilizes demographic data from the City of San Antonio to refine its marketing strategies in response to community needs, particularly focusing on areas with higher poverty levels. This data-driven approach ensures that outreach efforts are relevant and impactful.

Charleston County Public Library provides another example of adaptive, data-informed program planning. The evidence was provided, "We use data to capture success and areas for improvement. For instance, we've seen exponential growth in our adult readers during the summer reading program, particularly those without children. We used to target summer reading at children, but now we cater to adults too, and the feedback and data show that these programs are successful."

Las Vegas Public Library has also used data storytelling to advocate for its cultural programs. One example is its flagship programs, the Summerlin Chalk Festival, which invites artists from around the country to create stunning chalk art. At the beginning, the festival attracted approximately 1,000 attendees, the number has grown to 5,000 in recent years. To illustrate the program's impact and advocate for increased funding, they use metrics such as attendance figures, complemented by photographs of the event. This combination of data and visuals effectively

communicates the festival's significance to the community, highlighting its value and fostering support for future improvements.

Despite these promising examples, many libraries still struggle to communicate the full scope of their impact. While programs and services abound, the absence of clear main narrative can make it difficult to convey their value to funders, partners, and the public. Besides building on data-driven decision making and community impact narrative, more efforts are needed to include rebranding and broader narrative building.

Data Storytelling

Alignment with Mission and Vision-> Fusion Between Data Practices and Public Narratives

Last year, Las Vegas Public Library launched a successful mission with the tagline "Free to Be," aimed at highlighting the diverse experiences the library offers. The campaign focuses on seven key themes: curiosity, connection, captivation, fearlessness, inspiration, trailblazing, and self-expression. This rebranding effort has played a significant role in reshaping public perception of the library, positioning it as more than just a place for books. To ensure the campaign resonated with the community, the library conducted extensive testing through focus groups and surveys, including a Spanish-language version. This proactive approach ensured that the "Free to Be" message aligned with the diverse needs and values of their audience, contributing to its positive reception. Building on this reimagined identity, Las Vegas Public Library continues to use data storytelling to advocate for its cultural programs and initiatives. Staff members interviewed expressed pride in and clarity about the library's mission and vision, one staff expressed "This campaign has helped reframe how the public views libraries and has been well received". To align the mission and vision, it is essential to track hosted programs and activities to ensure they adhere to the vision's key categories, including learning, career success, government and social services, and community and culture.

However, such alignment does not always happen across libraries. In many cases, data and communications teams operate in silos, rarely interacting or understanding each other's roles. This lack of coordination creates barriers to synthesizing data into compelling narratives and limits the library's ability to communicate its full impact. Recognizing this gap, Harris County Public Library took a structural approach by establishing a new department dedicated to both data science and storytelling. This team is responsible for collecting and analyzing data as well as crafting internal narratives that highlight the library's work. Created in recent years, this department reflects an emerging awareness of the need to integrate technical analysis with communication strategy, ensuring that data and storytelling are not separate but integrated forces working toward a shared mission.

CONCLUSION

This study, though limited in scope, raises several compelling questions for future research and practice in the intersection of public libraries, data use, and storytelling. Through case studies and interviews with public libraries, we observed a wide spectrum of approaches to data management practices from including external partnership and feedback, diverse evaluation metrics of success, integrated data system, to public narrative strategies in data-driven decision making, community impact narrative. Despite this progress, **a common challenge emerged**: the need for public libraries to create cohesive, library-wide narratives that define their role and impact in the community.

Libraries must focus on improving their data practices, not only for internal decision-making but also for public communication. In the post group discussion with Austin Public Library, they mentioned they are inspired to create one main narrative for guiding internal operations but also for connect external communities they serve. But they also expressed concerns about lacking clarity on how to move forward in a meaningful, strategic way and they want concrete, actionable steps to make progress on data storytelling and internal coordination. Meanwhile, they also shouldered pressure from the city to publish more open data and are more cautious about uploading raw data without meaningful context or interpretation.

In the field of information science, these findings from public libraries emphasize the urgent need for public institutions to communicate data-drive impact to the public. Library staff expressed the desire to develop a central narrative to guide both internal operations and external community service but also raised concerns about the ethics and effectiveness of open data initiatives. In summary, while grounded in public library contexts, the findings speak to broader challenges faced by public organizations striving to transform big data into coherent, actionable, impactful narratives.

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